

REMARKS

Status of the Claims

Claims 1, 2, 4 and 12-21 are pending.

Claims 3 and 22-24 have been cancelled.

Claims 5-11 were subject to a restriction requirement and have been cancelled in a previous amendment.

Claim 1 has been amended to clarify that the welds are formed by localized impregnation of some of the thermoplastic polymer of the landing surface within the pores of the electroconductive gas diffusion layer comprising a porous body. No new matter has been added by this amendment.

Claim Rejections: 35 USC § 103(a)

In [3] of the Office Action, claims 1-4, 14-21 and 24 were rejected under 35 USC § 103(a) as being unpatentable over Davis et al. (GB 2 326 017A hereinafter Davis) in view of Sugita et al. (U.S. patent 6,455,179 hereinafter Sugita). This rejection is respectfully traversed.

The Manual of Patent Examining Procedure ("M.P.E.P.") states at §2141.02, entitled, **Differences Between Prior Art and Claimed Invention [R-5]** that "Ascertaining the differences between the prior art and the claims at issue requires interpreting the claim language, and considering both the invention and the *prior art references as a whole*" (emphasis added). The M.P.E.P. goes on to state in section VI of §2141.02, entitled, **PRIOR ART MUST BE CONSIDERED IN ITS ENTIRETY, INCLUDING DISCLOSURES THAT TEACH AWAY FROM THE CLAIMS**, that "A prior art reference must be considered in its entirety, i.e., as a whole, *including portions that would lead away from the claimed invention*. W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984) (emphasis added).

Applicants respectfully submit that the Examiner has not performed the examination of the pending claims in accordance those procedures and principles outlined in the Manual of Patent Examining Procedure set forth above.

Specifically, Applicants submit that the Examiner has not accorded sufficient weight to the negative teachings contained in Davis with respect to **four factors**, all of which are explicitly addressed and discussed in detail in Davis. They are:

- Low Cost
- Simplified Physical Construction
- Reduced Size
- Elimination of Elements

Davis discusses the construction of fuel cells extensively in the "Background" section, and refers to the **costs** of, for example, machining, fabricating and assembling a carbon bipolar plate. Davis goes on the state that this is "**one of the factors preventing widespread acceptance of fuel cell technology**". This section of the Davis reference concludes that it would be a significant addition to the field to provide a "**low cost** bipolar plate". See, page 2, line 20 to page 3, line 7.

Davis discusses that his thermoplastic bipolar plate **eliminates** "the need for additional gaskets or seals" (page 3, line 30) which impacts both **cost** and **simplicity** of physical construction.

Davis states that a polymer electrolyte membrane is preferred because they are easier to handle than liquid electrolytes, and accordingly, the "**physical construction** of the electrochemical cell is **greatly simplified** since elaborate seals and containment systems **are not needed**" (page 4, lines 4-12).

Davis states that "**lower cost** commodity thermoplastics are preferred, as they will result in a **lower cost** fuel cell assembly (page 5, lines 20-21) and the required

channels or grooves 37 are formed by various methods in such thermoplastics because it is "more efficient and **less costly**" (page 5, lines 26-31).

Davis discusses fusing because it "**eliminates** the need for external gaskets or seals" and that accordingly this "**reduces the cost and size** of the fuel cell stack by **eliminating** gaskets, their attendant **cost and size**, and **eliminates the need for expensive** machined carbon blocks" (page 6, lines 4-13).

Finally, when Davis **summarizes** his PEM fuel cell assembly, he states that the "bipolar plate utilizes **low cost** materials, and is adhesively bonded to the MEAs, thus **eliminating** the need for gaskets and other sealing means. The **size** of the assembly is **reduced along with the cost.**" (page 7, lines 27-31).

So, in conclusion, **the entire thrust of Davis**, that which the reference teaches **when considered in its entirety** is that (i) Low Cost, (ii) Simplified Physical Construction, (iii) Reduced Size and (iv) Elimination of Elements are the most important aspects of his PEM fuel cell assembly. As discussed above, these four factors are mentioned **approximately twenty times in the short 7 page document.**

The Examiner states that "it would have been obvious for one of ordinary skill in the art to include a gas diffusion electrode of Sugita to the porous electrode of Davis because this would ensure an efficient entry passage for the gases".

Although it is true that Davis does not disclose a GDL, Davis does far more than that, Davis fails to employ a GDL because that would run contrary to the entire theory and execution of his device.

The Examiner argues that "Davis is silent on whether the addition of a GDL would increase the cost of the fuel cell."

This argument is completely without merit because (1) as previously argued by Applicants Davis has already provided for means to distribute the gasses through the channels of his device and, more importantly, (2) the Examiner seems to be proposing that GDL's are without cost which is of course impossible.

The Examiner admits that Davis teaches that seals and gaskets are to be eliminated but argues that the elimination of a GDL is not disclosed. This argument

is also completely without merit because there is no need for a GDL in Davis' device. Consequently, there is **absolutely no reason whatsoever** for Davis to discuss the removal of an element for which there would be no purpose or reason to have included in the Davis device. Nothing can be concluded from this lack of disclosure, and accordingly, the Examiner's arguments in this regard are unpersuasive.

The lack of certain language or disclosure in the Davis reference is essentially the entire basis for the Examiner's rebuttal.

The fact that Davis may slightly increase cost of the thermoplastic resin in an element that is necessary and the core concept of his device in order to have the device perform properly is inconsequential in light of the overall four factors and goals of Davis.

The M.P.E.P. states that the Examiner should consider what the reference teaches, it does not say that Applicant's arguments should not be considered persuasive because a reference says absolutely nothing

The Examiner argues that the GDL "ensures efficient entry passage for the gases".

As previously argued, it is **eminently clear** that Davis has both (a) appreciated and **already provided** sufficiently for the necessary gas diffusion for his device and does not need nor desire an additional GDL and moreover (b) would consider such an additional element and its cost **entirely in opposition and contrary** to his stated goal of providing **a low-cost simple fuel cell device**.

Accordingly there is insufficient motivation to make the proposed addition of the Sugita GDL to the device of Davis.

Thus, in summary, the addition of the GDL of Sugita would destroy all four of the primary goals of Davis, to reduce both size and cost, eliminate elements and simplify construction. The GDL would also be superfluous because Davis has already considered and provided for sufficient and adequate gas diffusion in his device.

Finally, although the Examiner admits that (1) Davis does not disclose a GDL, there are **many more claimed features** that Davis does not disclose.

Davis does not have a GDL, therefore Davis does not disclose:

(2) a plurality of welds spaced along the first surface of the electroconductive **gas diffusion layer**,

(3) wherein the first surface of the **gas diffusion layer** is joined to the separator plate by the welds, and

(4) the welds are formed by localized impregnation of some of the thermoplastic polymer of the landing surface **within the pores of the electroconductive gas diffusion layer** comprising a porous body

(5) in a manner that the electrical contact between the conductive filler and the **gas diffusion layer** is maintained

Therefore, it follows that the Examiner has not set out a prima facie case of obviousness with respect to the claims because in addition to the lack of disclosure of a GDL, the **Examiner has not addressed 4 additional claimed features** which are not disclosed by Davis and/or Sugita.

It is respectfully submitted that Examiner has failed to make a prima facie case of obviousness in view of the applied references and that the rejection should be withdrawn.

The deficiencies of the combination, which as asserted above would not be made by one of ordinary skill in the art, are well described in the prior arguments incorporated by reference herein.

Accordingly removal of the rejection and allowance of claims 1, 2, 4 and 14-21 is respectfully requested.

In [4] of the Office Action, claims 12 and 13 were rejected as being unpatentable under 35 USC § 103(a) over Davis in view of Sugita as applied to claim 1, and further in view of Takagi et al., (U.S. patent 7,008,991 hereinafter Takagi). The

Examiner asserts that it would be obvious for a person skilled in the art to optimize the percentages of maleic anhydride polymer and liquid crystalline polymer of Takagi through routine experimentation as the weight percentages as recited is a results effective variable.

Takagi does not remedy the deficiencies of Davis and Sugita.

The deficiencies of the combination of Davis and Sugita, and now Tagaki, which as asserted above would not be made by one of ordinary skill in the art, are well described in the prior arguments incorporated by reference herein.

In view of the foregoing, allowance of claims 1, 2, 4 and 12-21 the above-referenced application is respectfully requested.

Respectfully submitted,

/BRIAN C. JONES/

BRIAN C. JONES
ATTORNEY FOR APPLICANTS
Registration No.: 37,857
Telephone: (302) 992-4601
Facsimile: (302) 992-2533

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